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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/544,210

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Yasufumi Takahashi

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EXAMINER

ARCIERO, ADAM A

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/544,210	Applicant(s) TAKAHASHI ET AL.	
	Examiner ADAM A. ARCIERO	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-29 is/are pending in the application.
- 4a) Of the above claim(s) 26-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1795

**CATHODE MIXTURE, NON-AQUEOUS ELECTROLYTE SECONDARY BATTERY, AND
ITS MANUFACTURING METHOD**

Examiner: Adam Arciero

Art Unit 1795

S.N. 10/544,210

February 23, 2010

DETAILED ACTION

1. The Applicant's amendment filed on October 20, 2009 was received. Claims 19-29 are currently pending. Claims 26-29 remain withdrawn from consideration.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

3. The claim rejections under 35 U.S.C. 102(b) as being anticipated by Biensan et al. on claims 19-21 are withdrawn.

Claim Rejections - 35 USC § 103

4. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Biensan et al. on claims 19-21 are maintained.

As to Claims 19-20, BIENSAN et al. discloses a nonaqueous electrolyte secondary battery having a cathode, anode and an electrolyte, wherein said cathode and anode comprise their respective active materials (col. 2, lines 65-68). BIENSAN et al. discloses a positive active material comprising a lithium cobaltate in which both Zr and Mg are contained wherein the amount of said Zr and Mg are not greater than 3 mole %, based on the total amount of the

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aforementioned elements and cobalt present in the lithium cobaltate (col. 1, lines 35-62 and col. 2, lines 1-14). Furthermore, it is noted that claim 1 is a product-by-process claim. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Since BIENSAN et al.'s battery is similar to that of the Applicant's, Applicant's process is not given patentable weight. BIENSAN et al. does not specifically disclose wherein a Zr-containing compound exists in the form of particles sintered with particle surfaces of the lithium cobaltate; and Zr is detected in the particles of the Zr-containing compound but not detected in the lithium cobaltate particles. However, it is the position of the Examiner that such properties of the active material are inherent, given that the materials and method for producing (sintering and mixing) disclosed by BIENSAN et al. and the present application have the same composition and steps. A reference which is silent about a claimed invention's features is inherently anticipatory of the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Furthermore, it would have been obvious to one of ordinary skill in the art to mix and heat-treat the materials because BIENSAN et al. teaches that an electrochemically active material with a high initial capacity per unit mass having stability during cycling can be achieved (col. 1, lines 30-34).

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As to Claim 21, BIENSAN et al. discloses wherein said materials are contained in substantially equimolar amounts (col. 2, lines 34-45).

5. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Biensan et al. and Miyasaka on claim 22 is maintained. The rejections are repeated below for convenience.

As to Claim 22, BIENSAN et al. does not specifically disclose the specific surface area of the positive active material as being not greater than $1.0 \text{ m}^2/\text{g}$.

However, MIYASAKA teaches of a nonaqueous electrolyte secondary battery (Title) wherein the specific surface area of the active material in the positive electrode is greater than $0.1 \text{ m}^2/\text{g} - 3 \text{ m}^2/\text{g}$ (col. 4, lines 18-21). This range overlaps the claimed range of not greater than $1.0 \text{ m}^2/\text{g}$. The courts have held that a *prima facie* case of obviousness exists wherein the claimed ranges “overlap or lie inside ranges disclosed by the prior art. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

6. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Biensan et al. and Iwasaki et al. on claim 23 is maintained. The rejections are repeated below for convenience.

As to Claim 23, BIENSAN et al. does not specifically disclose a ratio in charge capacity of the anode to the cathode as being 1.0-1.2.

However, IWASAKI et al. teaches of a nonaqueous electrolyte secondary battery (paragraph [0001]) which has a reversible capacity ratio of the negative electrode to the positive electrode as being $1.05 \leq x \leq 1.30$ (Abstract). This range overlaps the claimed range of 1.0 - 1.20. At the time of the invention, it would have been obvious to one of ordinary skill in the art

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to modify the capacity ratios of the negative electrode to the positive electrode to fall within the range of 1.05 to 1.30, because IWASAKI et al. teaches that heat generation and rupture are reduced and good cycle characteristics are obtained (Abstract).

7. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Biensan et al. and Tanaka on claim 24 is maintained. The rejections are repeated below for convenience.

As to Claim 24, BIENSAN et al. teaches of a solvent mixture for the electrolyte as being a mixture of linear carbonates and cyclic carbonates such as propylene carbonate and dimethyl carbonate (col. 3, lines 14-20). BIENSAN et al. does not specifically teach the volume percentage of said cyclic carbonate as being 10-30%.

However, TANAKA teaches of a nonaqueous electrolyte secondary battery (Title) wherein the electrolyte comprises a solvent mixture of ethylene carbonate (EC) and diethyl carbonate (DEC), wherein the cyclic carbonate (EC) is present in 25% of the volume of the total solvent mixture (pg. 6, Table 11, battery No. 073). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the electrolyte solution of BIENSAN et al. so as to comprise ethylene carbonate in a volume content of 25% of the total volume of the solvents, because TANAKA teaches that the safety of the batteries can be enhanced with proper choice of the electrolytic solution.

8. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Biensan et al. and Hironaka et al. on claim 25 is maintained. The rejections are repeated below for convenience.

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As to Claim 25, BIENSAN et al. does not specifically disclose wherein the positive electrode comprises a carbon material in the amount of less than 5 wt%.

However, HIRONAKA et al. teaches of a nonaqueous electrolyte secondary battery having a positive electrode with a positive active material. Said electrode further comprises a carbon material, a binder and a conductor, wherein the carbon material does not exceed 2 wt% of the total positive electrode materials (pg. 5, Table 3). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the electrode of BIENSAN et al. so as to comprise a carbon material of less than 5 wt % of the total electrode materials, because HIRONAKA et al. teaches that the cycle life and power characteristics of the battery can be improved.

9. Applicant's arguments filed October 20, 2009 have been fully considered but they are not persuasive.

Applicant's principal arguments are:

a) Biensan et al. does not direct a person of ordinary skill in the art to the specific selection of lithium cobaltate, as in the examples only lithium nickel oxides are disclosed (claim 19).

b) Biensan et al. does not disclose or suggest wherein element 'D' is part of a mixture and wherein a Zr-containing compound exists in the form of particles sintered with particle surfaces of the lithium cobaltate; and Zr is detected in the particles of the Zr-containing compound but not detected in the lithium cobaltate particles (claim 19).

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c) A person of ordinary skill in the art would not have reasonably expected Zr to function in the active material because Zr has a larger ion radius (claim 19).

d) The present application displays unexpected results for the use of the positive electrode active material of the present invention (claim 19).

Response to Arguments

10. In response to Applicant's arguments, please consider the following comments.

a) Biensan et al. does disclose the specific selection of lithium cobaltate (col. 2, lines 44-62).

b) The mixing and heating steps of claim 1 are treated as product-by-process and are not given patentable weight. Furthermore, Biensan et al. discloses forming a mixture comprising at least one lithium compound and at least one oxygen-containing compound of at least one transition metal, magnesium and an element represented by 'D' such as Zr (col. 2, lines 19-46). It is the position of the Examiner that such properties of the active material (argument b) are inherent, given that the materials and method for producing (sintering and mixing) disclosed by BIENSAN et al. and the present application have the same composition and steps. A reference which is silent about a claimed invention's features is inherently anticipatory of the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

c) Biensen et al. discloses the use of Zr in the positive active material as admitted in Applicant's arguments (pg. 4, start of last paragraph). Biensen et al. further discloses a range

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that overlaps the claimed range of wherein Zr and Mg are contained in a total amount of not greater than 3 mole % (col. 1, line 34 to col. 2, line 14).

d) Examiner disagrees with the assertion of unexpected results. Table 2 of the present application discloses two batteries comprising Zr in amounts not greater than 3 mole % (Example 1 and Example 9). Example 1 shows the best capacity retention after 250 cycles (94%), however Example 9 has a capacity retention after 250 cycles of 81.4%. These results are not significant.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 8am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795